



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION,
PESTICIDES AND
TOXIC
SUBSTANCES

January 21, 2004

MEMORANDUM

SUBJECT: Pesticide Root Zone Model (PRZM) Field and Orchard Crop Scenarios: Standard Procedures for Conducting Quality Control and Quality Assurance

FROM: Sid Abel, Chief
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TO: Steven Bradbury, Director
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Attached is a copy of the Environmental Fate and Effects Division's (EFED) current procedures for developing and conducting quality control and assurance of agricultural field crop modeling scenarios, Pesticide Root Zone Model (PRZM) Field and Orchard Crop Scenarios: Standard Procedures for Conducting Quality Control and Quality Assurance (Version 2, November 2001). The procedures were created to ensure consistency in Division wide pesticide exposure and risk assessments. In 2001, EFED's Organophosphorous (OP) Cumulative Risk Assessment development team identified the need for a standard set of development and quality control and assurance procedures as a critical component for aquatic exposure modeling to support both ecological risk and drinking water exposure assessments.

Following the development of these procedures, an internal peer review was conducted by EFED's Water Quality Technical Team and its Quality Assurance officers. Following this review, in 2002 the revised procedures were provided for review and comment for the OP Cumulative Risk Assessment by the Office of Pesticide Programs (OPP) Science Advisory Panel (SAP). Among the questions posed to the SAP was a request to comment on the reasonableness of the procedures used to develop the modeling scenarios for the crops included in the cumulative risk assessment. The SAP concluded that the procedures used appeared reasonable

for their intended purpose. As a final step, in late 2002, EFED published in the Federal Register a request for broader public comment of these procedures. Concurrent with the public comment period, EFED had been actively reviewing and improving the procedures as new data and advances in exposure assessment approaches became available.

EFED is currently addressing both internal and public comments. In particular, EFED is currently evaluating an issue relating to the characterization of where scenarios fall relative to all potential use sites in terms of vulnerability to runoff of pesticides. Until this is resolved, EFED has agreed to avoid referring to the current scenarios as "high-end" (i.e., 90th percentile or higher) in describing a crop site scenario's runoff potential. However, it is important to note that EFED has conducted several evaluations of the how well model predictions compare to monitoring data for many pesticides. As described in the OP Cumulative Risk Assessment, with rare exceptions, model predictions exceed all available monitoring data for a particular pesticide by a factor slightly less than a factor of 2 to more than one order of magnitude (i.e., a factor of 10 or more). The conclusions of these evaluations would then suggest that for most, if not all, of the exposure estimates generated to date using the currently available suite of scenarios, it is reasonable to conclude they are likely high-end.

**Pesticide Root Zone Model (PRZM) Field and Orchard Crop Scenarios:
Standard Procedures for Conducting Quality Control and Quality
Assurance**

November 15, 2001

OVERVIEW

The Pesticide Root Zone Model (PRZM) field or orchard crop scenario is the basic file which describes the local or regional climatological information, soil hydrology, soil characteristics, crop characteristics, and the pesticide properties necessary to determine pesticide loadings to ground or surface water. This basic file constitutes the “exposure scenario” which is the set of facts, assumptions, and inferences about how exposures may take place that aids the exposure assessor in evaluating, estimating, or quantifying exposures.

Exposure scenarios, such as the PRZM field and orchard crop scenario, have several general functions in exposure and risk assessments. They are the mathematical tools used to help the assessor estimate exposure and subsequently, dose and risk. The combination of data and information in the case of the PRZM scenario help the assessor and the risk manager to understand how the exposure is taking place. The estimates from the exposure scenario are used to develop exposure and risk descriptors for individuals, population or both. Exposure scenarios can help risk managers make estimates of the potential impact of possible control actions by changing assumptions in the exposure scenario.

PRZM exposure scenarios are generally composed to two major components. The field or orchard scenario is viewed as one component of the exposure scenario that, for the most part, does not change except when advancement in the knowledge about a particular parameter justify such a change. Its primary elements are the climatology, soils and specific crop information, and together, define the field or orchard scenario. The remaining principal component of the scenario is the pesticide specific information. Unlike the crop scenario, pesticide information is often changing as application rates, interval, and numbers change or as uses are added and removed and new information on the pesticide’s behavior in the environmental is developed.

Because exposure scenarios for combinations of crops and pesticide use are virtually limitless, managing the variability in one or both of the major components of the scenario provides a means of ensuring consistency in the assessment of pesticide exposures. Pesticide specific information is the most dynamic portions of the scenario, dramatically changing the exposure assessment with the slightest change in one or more parameters. However, with few exceptions, the field or orchard scenario (climatology, soil, and crop combination) changes very little with time and most changes have little or no effect on the exposure outcome. It is only when one of the three elements of the field or orchard scenario, climatology, soil or crop changes that the field or orchard scenario changes dramatically, however, as defined, the result is an entirely “new” field or orchard scenario.

Field and orchard scenarios are used repeatedly for many different pesticides and tend to be reused by an individual or many exposure assessors. The absence of constant change and the widespread use of field and orchard scenarios, provides an opportunity for “standardization.”

Standardization provides consistency in a major component of the PRZM exposure scenario. Procedures to ensure consistency in a PRZM field and orchard scenario during its development or modification for all elements associated with climatology, soil, and crop are provided in this appendix.

As an initial step, existing field and orchard scenarios were reviewed to determine those parameters that were germane to the climatology, soil, and crop. Each parameter was subjected to a defined set of quality control procedures to ensure that data were or would be (for those scenarios yet to be developed) of known or adequate quality, from sources that represent current state of the science, and were equally subjected to rigid quality control procedures by their developer. Previously generated data were used to fulfill current needs, and were reviewed and/or validated with respect to both quality and extrapolation to the current anticipated use. The review of historical data considered how long ago the data were collected and whether they remain representative.

Where existing or historical data were determined unrepresentative or of poor and questionable quality, information sources for each parameter of the field and orchard scenario were identified through a systematic search of available literature, professional contacts, government databases or experts, state and local field experts and through publically accessible electronic media such as the World Wide Web. Data sources were reviewed for completeness, validation, documentation, and age. For most parameters, a hierarchy of sources were provided to facilitate flexibility in selecting parameter values best suited for the particular scenario. In each case, the selection of a parameter required a justification and were documented in the scenario Metadata File. Where only one source of information was identified, the description and rationale was clearly provided to avoid compromising the scenario. Data sources and the selection hierarchy were institutionalized in a set of standard operating procedures (SOP) for conducting quality assurance and quality control of PRZM field and orchard scenarios and submitted to EFED's Water Quality Technical Team for scientific peer review. For some parameters, the document itself became the data source and/or reference for a parameter value.

The purpose of the standard operating procedures (SOP) is to document the set of methods, actions, and steps, under the Agency's and EFED's quality system, necessary to facilitate consistency in the quality and integrity of the review and development of each PRZM field and crop scenario. These procedures promote a transparent and consistent process of acceptable, comparable, and defensible operating procedures for developing and reviewing exposure scenarios. The SOP is intended to be used by all staff in EFED and may be used by exposures assessors outside its organization wishing to present assessments to the Agency for review and use. They minimize opportunity for miscommunication, serve as training information, provide a means of reconstructing a scenario, and provide a permanent record of how each scenario was developed and reviewed, long after the authors have left the organization.

Certain parameters of the field and orchard scenario are known to be more sensitive than others and as such have a greater impact on the pesticide transport to surface or ground water. By examining the individual components of the scenario, scientists and risk managers can focus their efforts on the factors that contribute most to the exposure and risk and use these to select options

to reduce exposure. Relying on experience with the use of PRZM, field studies, and model evaluations, a determination was made as to the sensitivity of scenario parameters to pesticide runoff from a treated field. Once identified, these parameters were given greater attention during the identification of reliable and certified results for parameter value selection. These parameters were often limited to a few sources of information because standards of reliability and certification were more stringent in an attempt to minimize parameter uncertainty. Remaining parameters often had more sources of information from which to select a value or provided more flexibility in the tolerance of a value.

Scenarios were developed in such a manner to represent the “high-end” of all sites where a crop could be grown and would be vulnerable to surface runoff within a given geographic region. The selection of site parameters are based on the best professional judgement of the scientist in consultation with experts within and outside of EFED and the Agency and are not merely a random aggregation of parameters to form the scenario. Classically defined, if all the sites where a particular crop could be grown in an area were placed on a distribution according to pesticide runoff, the high-end site would represent a site where 90th percent or more of all sites would have less pesticide runoff, but remain below the site that would yield the highest exposure. Combinations of parameters were avoided that were inconsistent with what might occur in an actual agricultural setting or would introduce a systematic error resulting in a scenario that would likely result in the maximum exposure on a true distribution or theoretically exceed the maximum exposure on a true distribution. In short, the field and orchard scenario was developed to represent an actual agricultural field within the limits of the model.

Providing oversight to the quality control is the Environmental Fate and Effects Division’s (EFED) quality assurance system. This system provides the policies and administrative requirements that covers the implementation and review of the procedures for the quality control of each field and orchard scenario.

Any discussion of the development or use on an exposure scenario, regardless of its simplicity, cannot exclude a discussion of its uncertainty. Assessing uncertainty may involve simple or complex techniques depending on requirements of the assessment. Uncertainty discussions may take the form of a characterization or an assessment, each having a very different level of sophistication. An “uncertainty characterization” is generally the least sophisticated and takes the form of a qualitative discussion of the thought processes that lead to the selection and rejection of specific data or information in the PRZM field and orchard scenario. On the other hand, an “uncertainty assessment” is generally more quantitative and may include simple or complex assessment measures and techniques. Two types of uncertainty presented here in general terms that are directly related to the PRZM field and orchard scenario, *scenario uncertainty* and *parameter uncertainty*. A third type of uncertainty, *model uncertainty*, is discussed elsewhere.

Scenario uncertainty is associated with missing or incomplete information needed to fully define the exposure. Are all essential and crucial elements of a soils characteristics, crops cultural practices or climatological information captured in the scenario which is foundation of a representative exposure scenario. These are generally defined as descriptive errors. Another

source of errors, thus uncertainty, are referred to as aggregation errors. The most obvious error of this type is represented by the fact that a large field such as the Index Reservoir watershed is made up of an homogenous soil, whether within a series or across a number of soil series. Others include crop planting, emergence, maturation and harvest dates uniform throughout the watershed, although this factor may have little impact on the overall exposure assessment. Another source of error is in professional judgement. PRZM field and crop scenarios, as well as the SOP developed to "standardize" and ensure the quality of each scenario may suffer from the uncertainty associated with poorly defining a procedure or in the judgement to select one parameter value over another whether permitted by guidance or not. It is safe to say that every exposure assessment suffers from this type of error, but remains a valuable aspects of any assessment for numerous reasons. The SOP and each scenario derived using the SOP includes a discussion or reference to allow a reader to make an independent judgement about the validity of the scenario.

Parameter uncertainty arises from errors in measurements, sampling, variability, and the use or surrogate or generic data. Most parameters germane to the PRZM field and orchard scenario arise from sources that provide information to describe the errors that may occur in their data, especially measurement and sampling error. Measurement errors may be random (imprecision in the measurement) or systematic (bias or tendency away from the true value), while sampling error arises from making inferences about the representativeness of data for a parameter from a subset of the total population. Sample error may also arise from the use of data for a purpose other than used in the scenario. Variability uncertainty arises in the scenarios from climatological that may vary widely from one season to the next, soil properties that vary spatially across a landscape, even within the same series, or the emergence and harvest dates that vary spatially and temporally from year to year. Each scenario was developed consciously avoiding the use of surrogate or generic data. However, data limits on such crop factors as the conservation practices and Manning's N values (surface roughness) necessitated the use of surrogate information from similar crops. In most cases, characterizing uncertainty in the parameter is described in the source material using classical methods such as a description of the range or a probabilistic description of the parameter range. If, based on the parameter uncertainty, the assessor needs to know the impact of parameter uncertainty in the overall exposure assessment, a number of methods exist to aid in determining the impact. These methods include, but are not limited to sensitivity analysis, probabilistic analysis, analytical uncertainty propagation, and the more classical statistical methods.

The procedures that follow are intended for exposure and risk assessors in the Agency and those exposure and risk assessment consultants, contractors, or other persons who perform work to be submitted to the Agency for review. In addition, risk managers may also benefit from this document since it clarifies and presents in a transparent format the terminology, procedures, methods, and sources of information used by the Environmental Fate and Effects Division of the Office of Pesticide Programs to develop, document and certify a "standard" PRZM crop scenario.

PROCEDURE FOR CONDUCTING QUALITY ASSURANCE AND QUALITY CONTROL OF EXISTING AND NEW PRZM FIELD AND ORCHARD CROP STANDARD SCENARIOS

Shaded Records indicate parameters that need to be included in the development and review of Standard PRZM Field and Orchard Scenarios.

Getting Started: New Scenarios. The recommendation of the PRZM Field and Orchard Scenario QA/QC Subgroup is to use the PRZM Input Collator (PIC) running under the PIRANHA 3.0 Shell to “build” a draft crop scenario. PIC will provide the basic cropping information, crop characteristics, field characteristics, and soil characterization information necessary to begin the development of the scenario. Soils information should be checked against data provided in the USDA’s National Soils Characterization Database, County Soils Survey, or in consultation with the County or State Soil Scientist. Information and contacts can be found at: <http://www.statlab.iastate.edu/soils/nsdaff/>. Crop specific and meteorological information can be certified using the various references outlined in the QA/QC procedures below.

Select the Major Land Resource Area (MLRA) for the crop to be modeled from the Land Resource Regions and Major Land Resource Areas of the United States; <http://www.ma.nrcs.usda.gov/mo/momap.htm>. Using PIC, select the crop to be modeled and proceed. If the crop does not appear on the list, you will need to select the closest related crop to model and rely on the QA/QC procedures later in this document to ensure crop specific parameters and soil selection are appropriate. Examples of crops that will not be available in PIC are orchard crops and alfalfa. Meadow/Pasture/Hay should be selected for orchards and alfalfa and the QA/QC procedures followed to modify the information for the specific crop to be modeled.

The soil selected should be a benchmark soil that is in hydrologic group “C” or “D”. A benchmark soil is one of large extent, one that holds a key position in the soil classification system, one for which there is a large amount of data, or one that has special significance to farming, engineering, forestry, ranching, recreational development, urban development, wetland restoration, or other uses. A listing of benchmark soils can be found at: <http://www.statlab.iastate.edu/soils/nssh/630.htm> If a benchmark soil is unavailable, select the “C” or “D” soil with the greatest extent within the MLRA, or select a benchmark soil from the available list and search the National Soils Characterization Database for the availability of data for use in creating the soil profile. It is advisable to check the NRCS Official Soils Description Web page, <http://www.statlab.iastate.edu/soils/osd/>, to be sure the soil/crop combination is feasible or talk to a county Extension Agent. If a “C” or “D” soil is unavailable, notify a Scenario Team member or bring your request to the Water Quality Technical Team for assistance in selecting a suitable soil.

PIC produces a PRZM Version 1.0 Input File. Records 1 through 9 are essentially the same, therefore, transferring Records from PRZM 1.0 to PRZM 3.12 does not require conversion different than converting from PRZM 2.3 to PRZM 3.12; relocation of the “C” factors from Record 9 in PRZM 2.3 to Record 9C in PRZM 3.12 is the major difference. The soil profile parameters will need modification. The table below provides the parameter location for a PRZM 1.0 Input file and a PRZM 3.12 Input file to be used for guidance in converting. Also,

an example PRZM 1.0 “.inp” file (PRZM1EXP.inp) with all parameters to be transferred identified according to PRZM 3.12 nomenclature is provided on the LAN under: F:\USER\SHARE\Models\Aquatic Exposure\PRZMEXAMS\Scenarios\STD_SCE\QA_QC OP SCENARIOS\General Documentation

In a PRZM 1.0 Input file, the soils information begins after the “Soils Title” on the printout. Record 19 corresponds to this position in a PRZM 3.12 Input file. The tables below begin at these points. If at any time you need help, contact a member of the Scenario Team.

Once the parameters from the PRZM 1.0 file have been transferred to the Excel PRZM Input Spreadsheet, follow the guidance below under QA/QC PROCEDURE to complete, verify and revise the PRZM scenario.

PRZM 1.0 Format: Record Number not apparent on printout. Base conversion starting with the “Soils Title” printed on the Input File

RECORD #	PARAMETERS
	Soil Title
Next Record	Total Depth of Soil Core - Remainder of Columns in this Record may be set to “0” or another value. Do not transfer these values. They are set and locked to “0” in the Excel spreadsheet. The location of these values are in the example.
Next Record	Total Number of Horizons
Next Record	Horizon Number (HORIZN)
	Horizon Thickness (THKNS)
	Bulk Density (BD)
	Hydrodynamic Solute Dispersion Coefficient (DISP)
	Decay Rate in the Soil Horizon
	Initial Soil Water Content (THETO)
	Soil Drainage Parameter (ADL)
Next Record	Field Capacity (THEFC)
	Wilting Point (THEWP)
	Partition Coefficient (KD)
	Organic Carbon (OC)

PRZM 3.12 Format

RECORD #	PARAMETERS				
19	Soil Label (STITLE)				
20	Total Depth of Soil Core - Remainder of Columns (fields) in Record 20 are set to "0" and will be locked.				
33	Total Number of Horizons (NHORIZ)				
34	Horizon Number (HORIZN)	Horizon Thickness (THKNS)	Bulk Density (BD)	Initial Soil Water Content (THETO)	Soil Drainage Parameter (AD)
36	Pesticide Specific Decay Rate in Soil Horizon				
37	Compartment Thickness (DPN)	Field Capacity (THEFC)	Wilting Point (THEWP)	Organic Carbon (OC)	Partition Coefficient (KD)

QA/QC PROCEDURES

These general procedures are for the review of an existing or the creation of a new PRZM field or orchard scenario.

PRZM Record Number	PRZM Description	Input Value	Source
1	TITLE - Simulation Label	File name and Development Date	<p>QA/QC Workgroup consensus: Use the official 2-letter state ID or state name followed by the crop name, e.g., Florida tomato or FLtomato. Include the creation date or QA/AC date if crop scenario currently exists. All scenarios will be based on the index reservoir (field size and hydraulic length) with the EFED Shell or the modeler modifying the PRZM scenario for the pond. For new crop scenarios, regional or national representative sites should be based on the county with the most acres in production among the counties most vulnerable to surface water contamination. For example, when selecting between Johnston or Pitt Counties in NC for a tobacco scenario, both with equal acreage in production, Pitt County should be used because it lies almost entirely in the coastal plain and the precipitation is greater than Johnston County which lies in the Piedmont. In addition, attention to the "Curve Numbers" and hydrologic grouping for the soils is necessary to ensure the reasonableness of the runoff conditions as a representative 90th percentile exposure site. Newly created scenarios should go through peer review by the WQTT or the current Scenario QA/QC subgroup. Use of Benchmark Soils is required unless a justification is provided. Benchmark soils are located at:</p> <p>http://www.statlab.iastate.edu/soils/nssh/630.htm or on the LAN under F:\USER\SHARE\Models\AquaticExposure\PRZMEXAMS\Scenarios\STD_SCEN\QA_QC_OP_SCENARIOS\General Documentation. The electronic file should be named using the official 2-letter state ID (uppercase) followed by the crop name (lowercase), e.g., Fltomato, for the Excel spreadsheet. After a scenario has undergone QA/QC, the name will have an upper case "C" added. The PRZM input file will be created following QA/QC and named using the state code and the first 5 letters of the crop name followed by a "C".</p>
2	HTITLE - Hydrology information title	County Name and MLRA	<p>Use the full county name for the crop scenario. The Major Land Resource Areas (MLRA) are from the USDA NRCS. Where counties exist in two or more MLRA, the MLRA that contains the greatest amount of land for the crop/soil combination should be used. All other variations should be justified in the Metadata File. MLRAs may be found at:</p> <p>http://www.nhq.nrcs.usda.gov/land/meta/m2147.html</p>

PRZM Record Number	PRZM Description	Input Value	Source
3	PFAC - Pan evapotranspiration		The PRZM Input Collator (PIC) running under PIRANHA (Burns, 1992) will generate this value. Use the PRZM 3 Manual, Figure 5.1 (Carsel, <i>et al.</i>) to verify. Slight deviations are tolerable (1 unit) especially in parts of California because of the poor resolution of Figure 5.1. Accept the PIC value if it is within the tolerance. Otherwise, use the value for the specific region based on the location of the crop scenario. The MLRA may also be used as a guide in selecting the appropriate value.
	SFAC - Snow melt factor (cm °C ⁻¹ day ⁻¹)		The PRZM Input Collator (PIC) running under PIRANHA (Burns, 1992) will generate this value. Use the PRZM 3 Manual, Table 5.1 (Carsel, <i>et al.</i>) to verify. Slight deviations are tolerable, but should be less than the minimum value in the maximum range of values. Accept the PIC value if it is within tolerance. Use the maximum value of the minimum range of values for the specific coverage based on the crop for scenarios developed without PIC or if PIC returns a value in the maximum range category. For row crops use the "open areas" range of values and for orchard crops use the "mixed coniferous/deciduous open areas" range of values. In areas where snowfall is not expected to occur or accumulate and persist for more than a day, a default value of 0.0 is recommended. For further details on this factor visit the National Weather Service River Forecast System (NWSRFS) User's Manual (Anderson, 1978) at: http://www.nws.noaa.gov/oh/hrl/general/indexdoc.htm
	IPEIND - Pan factor flag	Set to "0" in all scenarios	Set the flag to "0" allowing the pan data to be read from the weather file.
	ANETD - Depth to which evaporation is extracted (cm)		The PRZM Input Collator (PIC) running under PIRANHA (Burns, 1992) will generate this value. Use the PRZM Manual Figure 5.2 (Carsel, <i>et al.</i>) to verify. Slight deviations are tolerable, especially along boundary zones. Accept the PIC value if the difference between PIC and Figure 5.2 does not exceed 4 units (cm). Otherwise, use the mid-point of the range of values based on location of the crop scenario. If a crop region crosses one or more boundaries, select the mid-point value of lowest range of values.

PRZM Record Number	PRZM Description	Input Value	Source
	INICRP - Initial crop flag	Set to "1" in all scenarios	The simulation date should always occur before the emergence date for row crops. For orchard crop the emergence date may be the bud set, flower set, fruit set, etc date. Therefore, set the value to "1" as well.
	ISCOND - Surface condition of initial crop	Crop specific	If unknown, set to a default of fallow or consult with the Extension Agent in the county of the modeled crop for the dominant practice. Does the plant material get left behind or disced (residue) from a previous crop, cover crop exists (cropping) or all material removed (fallow). Provide details in the scenario Metadata File if discussed with Extension Agent.
	DSN - Weather data (5 values)	Leave blank	Used only if you are reading weather data from sources other than the standard MLRA weather files.
<p>Note (Records 7-9): For new scenarios, the assessor should make every effort to select the soil/crop combination for the County/MLRA using PIC under the PIRANHA shell. PIC will select the appropriate values which can then be verified using the QA/QC process described. If PIC does not contain a suitable soil/crop combination, the scenario must be constructed from the data sources identified in this guidance.</p>			
4 and 5	Not Used. Linked to IPEND	Omit	
6	ERFLAG - Erosion flag	Always set to 4 (MUSS)	Method by which erosion is calculated. MUSS method is specifically designed for small watersheds of which the pond and reservoir watershed classically fit (Carsel, et al.). PIC will not generate this value.

PRZM Record Number	PRZM Description	Input Value	Source
7	USLEK - Soil erodibility factor	Soil specific	<p>The PRZM Input Collator (PIC) running under PIRANHA (Burns, 1992) will generate this value. Use the following to override or verify the PIC value. Slight deviations are tolerable, but not more than 10 percent. When site specific data are absence, such as the case for nearly all new and existing scenarios, follow this procedure: First: If the soil series name is available in the GLEAMS Manual (USDA, 1990) table for Representative Soils, use the "K" value provided; to verify the "K" value from PIC or if the soil is not available and a scenario is being constructed without the benefit of PIC, use Table 3.1 (page 35) of the FARM Manual (EPA, 1985) to estimate the "K" value. Because the value estimated using Table 3.1 is associated with organic matter (OM) content and there are limited OM categories, if the "K" value from PIC is different by more than 10 percent, bring it to the attention of the Scenario Team or the Water Quality Technical Team for resolution; otherwise accept the PIC value. A copy of this table is available on the LAN (F:\USER\SHARE\Models\Aquatic Exposure\PRZMEXAMS\Scenarios\STD_SCEN\QA_QC_OP_SCENARIOS\General Documentation) directory converted for the PRZM input organic carbon (OC) content. Use the soil OC content that most closely represents the soil series for the scenario. When sufficient details on the site to be modeled, such as the slope length and percent slope at different points on a convex or concave land surface, this value may be estimated using the USDA/ARS RUSLE Version 1.06 program (USDA, 2001). A copy of this program in the form of a "zip executable" is located on the LAN under: F:\USER\SHARE\Models\Aquatic Exposure\PRZMEXAMS\Scenarios\STD_SCEN\QA_QC_OP_SCENARIOS\RUSLE 1.06 Folder or may be obtained at http://msa.ars.usda.gov/ms/oxford/nsi/rusle/</p>

PRZM Record Number	PRZM Description	Input Value	Source						
	USLELS - Topographic factor	Soil specific	<p>The PRZM Input Collator (PIC) running under PIRANHA (Burns, 1992) will generate this value. Use the procedures below to verify the value. Slight deviations in results are tolerable. Note: be aware that a number of existing scenarios seem to default to 1.0 for LS. When site specific data are absence, such as the case for nearly all new and existing scenarios, follow this procedure: First: If the soil series name is available in the GLEAMS Manual (USDA, 1990) table for Representative Soils, use the "LS" value provided; or: if it is not available, use the following equation (Haan and Barfield, 1979):</p> $LS = \left(\frac{\lambda}{72.6} \right)^m (\frac{430x^2 + 30x + 0.43}{6.613})$ <p>where: λ is slope length x is θ and θ is slope angle (percent slope/100 = θ) m is a constant according to:</p> <table style="margin-left: 40px;"> <tr> <td>Slope $\leq 3\%$</td> <td>$m = 0.3$</td> </tr> <tr> <td>Slope = 4%</td> <td>$m = 0.4$</td> </tr> <tr> <td>Slope $\geq 5\%$</td> <td>$m = 0.5$</td> </tr> </table> <p>Unless the slope length for the field being modeled is known (not hydraulic length, HL), assume a slope length of 400 feet as a default. Haan and Barfield indicate that slope lengths rarely exceed 400 feet for slopes between 3 and 20 percent, within the recommended slopes for reasonable agricultural activities. For an additional references see: http://www.statlab.iastate.edu/soils/nssh/618.htm If the slope parameter is unknown for the simulated field, set at a default of 6 percent for row crops and 12 percent for orchards and field crops such as hay, alfalfa, wheat, etc. According to soil Capability Classes, slopes greater than those above present substantial challenges to agricultural uses. When sufficient details on the site to be modeled, such as the slope length and percent slope at different points on a convex or concave land surface, this value may be estimated using the USDA/ARS RUSLE Version 1.06 program (USDA, 2001).</p>	Slope $\leq 3\%$	$m = 0.3$	Slope = 4%	$m = 0.4$	Slope $\geq 5\%$	$m = 0.5$
Slope $\leq 3\%$	$m = 0.3$								
Slope = 4%	$m = 0.4$								
Slope $\geq 5\%$	$m = 0.5$								

PRZM Record Number	PRZM Description	Input Value	Source
	USLEP - Practice factor	Set to 1 for Orchards. Set to 0.5 or 0.6 depending on slope for row crops	The PRZM Input Collator (PIC) running under PIRANHA (Burns, 1992) will generate this value. Use the following to verify the value. Slight deviations in this value are tolerable. Orchards: PRZM 3 Manual, Table 5.6 (Carsel, <i>et al.</i>). Row Crops: If contour plowing is not common: set to 1. If contour plowing is common: set to 0.5 if slope is 3 - 8 percent and 0.6 if slope is 1 - 2 or 9 - 12 percent. Verify with local Extension Agent the extent to which contour plowing is used in the region for that crop. Provide details in the scenario Metadata File. For further details on this parameter see: http://www.brc.tamus.edu/epic/appendices/erosioncontrol.html
	AFIELD - Size of field (ha)	10 ha pond; 172 ha reservoir. Set to 172 ha as a default	Standard farm pond based on, USDA, 1982. Index Reservoir based on Jones, <i>et al.</i> , 2000.
	IREG - Location of Hyetograph	Set to region of US	PRZM 3 Manual, Figure 5.12 (Carsel, <i>et al.</i>)
	SLP - Slope (%)	Soil Specific	Consult the Official Soils Description Database (Http://www.statlab.iastate.edu/soils/osd/) to obtain the range of slopes for the series. Select mid-point if upper range does not exceed 12 percent (upper-end of slopes on which cultivation for most crops is reasonable). For soils with maximum slopes of greater than 12 percent, contact the local Extension Agent to select a reasonable value or set at a maximum of 6 percent for row crops and 12 percent for orchard and field crops such as hay, alfalfa, wheat, etc. Provide details in the scenario Metadata File.
8	HL - Hydraulic Length (m)	Pond 356, Reservoir 600	Pond: Radius of a circle around a 1 ha pond (USDA, 1982). Reservoir: Index Reservoir based on Jones, <i>et al.</i> , 2000.
9	NDC - Different crops in a simulation	Set to "1"	QA/QC Workgroup consensus: Most scenarios will model only one crop.
	ICNCN - Crop number of the different crop	Set to "1"	QA/QC Workgroup consensus: Most scenarios will model only one crop.

PRZM Record Number	PRZM Description	Input Value	Source
	CINTCP - Max interception storage of crop (cm)	Crop specific	PRZM 3 Manual (Carsel, <i>et al.</i>), Table 5.4 (limited number of crops) or accept the PIC value. For orchard crops, the value should range from 0.25 to 0.30. Verify that PIC is returning a value in this range for an orchard because PIC does not have orchard crops in its database, otherwise change to 0.25. PRZM always meets the canopy storage requirement first. The remaining precipitation is then available for runoff or infiltration. The QA/QC team is currently tracking down the original reference(s) for this parameter for the purpose of expanding the available selection of crops.
	AMXDR - Max rooting depth of crop (cm)	Crop specific	The PRZM Input Collator (PIC) running under PIRANHA (Burns, 1992) will generate this value. Use the following to verify the value. PRZM 3 Manual (Carsel, <i>et al.</i>), Table 5.9 and/or verify with Extension Agent in county of modeled crop. Orchard crops are not available under PIC, therefore, another source is necessary such as the Extension Agent or a crop reference; the BEAD library contains numerous references on crop cultivation as does the USDA crop profile web links. Provide details in the scenario Meta File.
	COVMAX - Max aerial canopy coverage (%)	Crop specific	Set to a default of 100 percent for most row crops. Other crops and orchards should be verified with the local Extension Agent or other authoritative source; the BEAD library contains numerous references on crop cultivation as does the USDA crop profile web links. Provide details in the scenario Meta File.
	ICNAH - Surface condition of crop after harvest	Crop specific	Set to residue unless it is known that a cover crop is routinely planted or consult with an Extension Agent in county of modeled crop. Does the plant material get left behind or disced (residue) and cover crop planted (cropping) or all material removed (fallow). Provide details in the scenario Metadata File. Generally, residue results in more pesticide available for runoff.

PRZM Record Number	PRZM Description	Input Value	Source
	CN - Curve number for runoff (3 values)	Crop/soil dependent	<p>The PRZM Input Collator (PIC) running under PIRANHA (Burns, 1992) will generate these values. Use the following to verify the values.</p> <p>Deviation from GLEAMS values is not acceptable. The CN values is the most sensitive parameter in PRZM. Primary source for information: is GLEAMS (USDA, 1990), Table A-3. Select the values according to the crop and soil hydrologic class. A file for soil series Hydrologic Groups is located on the LAN at: F:\USER\SHARE\Models\Aquatic Exposure\PRZMEXAMS\Scenarios\STD_SCEN\QA_QC OP SCENARIOS\General Documentation as file Hsg.doc. For orchard crops, use the three values for Meadows. Although not specific to orchards entirely (not representative of area under the trees), other choices are less appropriate. The sequence is fallow; value 3; cropping; value 1; residue; value 2. The CN values for row crops should begin with the appropriate tillage practice for the crop under fallow: select the second value; the next two values should refer to the crop under cropping conditions; select in sequence the second and third value. Approaches other than the generic example provided must be documented in the Metadata File for the scenario. Additional Curve Number info can be found in: National Engineering Handbook; Chapters 9 (USDA, 1997) at: http://www.wcc.nrcs.usda.gov/water/quality/common/neh630/4/content.htm</p> <p>This handbook is consistent with the GLEAMS manual, but, lacks the details for agricultural fields over a growing season (3 values for a given Hydrologic Group). If there are any questions or doubts concerning the selection of the appropriate CN values, consult a member of the Scenario Team.</p>
	WFMAX - Max dry weight of crop at full canopy (kg/m ²)	Crop Specific	NOT USED.
	HTMAX - Max height of canopy at maturation (cm)	Crop specific	PIC does not provide this value. Consult the Extension Agent in the county of modeled crop or other authoritative source; the BEAD library contains numerous references on crop cultivation as does the USDA crop profile web links. Provide details in the scenario Metadata File.

PRZM Record Number	PRZM Description	Input Value	Source
9A	CROPNO - Crop Number	Set to "1"	Generally only one crop modeled.
	NUSLEC - Number of USLEC factors (cover management factor)	Determined by the RUSLE values available	<p>Number and specific values for the Dates, "C" and "Manning's N" factors are available from "RUSLE EPA Pesticide Project, USDA/ARS, (USDA, 2000). Select the crop being modeled in the Land Resource Region (LRR) and the appropriate tillage system. Data are available in electronic format on the LAN at: F:\USER\SHARE\Models\Aquatic Exposure\PRZMEXAMS\Scenarios\STD_SCEN\QA_QC_OP SCENARIOS\RUSLE "C" and "N" FACTORS. Select the appropriate crop/region combination code and extract the file from the LAN. NOTE: Each line of values must be fed into the Excel spreadsheet one at a time according to the Record number. The first line of the file is Record 9A; the second line is Record 9B; third line Record 9C; and fourth line Record 9D. If an additional set of lines are available (this is likely the case), the fifth set is Record 9B, sixth set Record 9C and seventh set Record 9D. Record 9A does not repeat.</p>
9B	GDUSLEC - Day to start USLEC and Manning's N factor	Crop Specific	<p>Number and specific values for the Dates are available form "RUSLE EPA Pesticide Project, USDA/ARS, (USDA, 2000). Data available in electronic format on the LAN at: F:\USER\SHARE\Models\Aquatic Exposure\PRZMEXAMS\Scenarios\STD_SCEN\QA_QC_OP SCENARIOS\RUSLE "C" and "N" FACTORS. Select the appropriate crop/region combination. See Note in Record 9A.</p>
	GMUSLEC - Month to start USLEC and Manning's N factor	Crop Specific	<p>Number and specific values for the Dates are available form "RUSLE EPA Pesticide Project, USDA/ARS, (USDA, 2000). Data available in electronic format on the LAN at: F:\USER\SHARE\Models\Aquatic Exposure\PRZMEXAMS\Scenarios\STD_SCEN\QA_QC_OP SCENARIOS\RUSLE "C" and "N" FACTORS. Select the appropriate crop/region combination. See Note in Record 9A.</p>

PRZM Record Number	PRZM Description	Input Value	Source
9C	USLEC - Soil loss cover management factors for fallow, cropping and residue	Crop/soil specific	Number and specific values for the "C" factors are available form "RUSLE EPA Pesticide Project, USDA/ARS, (USDA, 2000). Data available in electronic format on the LAN at: F:\USER\SHARE\Models\Aquatic Exposure\PRZMEXAMS\Scenarios\STD_SCEN\QA_QC_OP_SCENARIOS\RUSLE "C" and "N" FACTORS. Select the appropriate crop/region combination. See Note in Record 9A.
9D	MNGN - Manning's N	Crop/soil specific	Number and specific values for the "Manning's N" factors are available form "RUSLE EPA Pesticide Project, USDA/ARS, (USDA, 2000). Data available in electronic format on the LAN at: F:\USER\SHARE\Models\Aquatic Exposure\PRZMEXAMS\Scenarios\STD_SCEN\QA_QC_OP_SCENARIOS\RUSLE "C" and "N" FACTORS. Select the appropriate crop/region combination. See Note in Record 9A.
10	NCPDS - Number of cropping periods	Specific to MLRA weather data	PIRANHA Version 3.0 Manual, Appendix B. (Burns, L.A., <i>et al.</i> , 1992). Based on MLRA weather file or crop agricultural practices when planting is less than yearly, e.g., sugarcane, if pesticide is applied at planting.
11	EMD/EMM/IYREM - Day, month and year of crop emergence	Crop specific	USDA Crop Profiles my contain the necessary information. http://ipmwww.ncsu.edu/opmppiap/suberp.htm or http://www.ippc.orst.edu/IPM-NWecoregion/index.cfm or for orchards http://tfpg.cas.psu.edu/ Also, the Usual Planting and Harvesting Dates for U.S. Field Crops (USDA, 1984) may be used. If neither has the necessary information, consult with the local Extension Agent in the county of modeled crop. Provide details in the scenario Metadata File.
	MAD/MAM/IYRMAT - Day, month and year of crop maturation	Crop Specific	USDA Crop Profiles my contain the necessary information. http://ipmwww.ncsu.edu/opmppiap/subcprp.htm or http://ipmwww.ncsu.edu/opmppiap/subcprp.htm or http://www.ippc.orst.edu/IPM-NWecoregion/index.cfm or for orchards http://tfpg.cas.psu.edu/ Also, the Usual Planting and Harvesting Dates for U.S. Field Crops (USDA, 1984) may be used. If neither has the necessary information, consult with the local Extension Agent in county of modeled crop. Provide details in the scenario Metadata File.

PRZM Record Number	PRZM Description	Input Value	Source
	HAD/HAM/YRHAR - Day, month and year of crop harvest	Crop Specific	USDA Crop Profiles my contain the necessary information. http://ipmwww.ncsu.edu/opmppiapp/subcrp.htm http://ipmwww.ncsu.edu/opmppiapp/subcrp.htm or http://www.ippc.orst.edu/IPM-NWecoregion/index.cfm or for orchards http://ftp.cas.psu.edu/ Also, the Usual Planting and Harvesting Dates for U.S. Field Crops (USDA, 1984) may be used. If neither has the necessary information, consult with the local Extension Agent in county of modeled crop. Provide details in the scenario Metadata File.
	INCROP - Crop number associated with NDC	Set to "1"	Generally only one crop modeled.
<p>For new scenarios developed using PIC, PIC will set all parameters except the Manning's N value. Verify all values set by PIC using the above QA/QC process. Replace the Dates, "C" and "Manning's N" values according to the above procedure, Record 9A, 9B, 9C and 9D</p>			
<p>Records 12-18 are specific to the pesticide being modeled. Follow instructions and guidance under the Source Column. They are noted here to ensure consistency when "running" a scenario.</p>			
12	PTITLE - Label for pesticide title	Application schedule.	Line generally reserved for pesticide application schedule: method (ground aerial, etc), rate in kg/ha, and target application efficiency. Under the EFED Script Shell, this information will be set from the input screen.
13	NAPS - Total number of pesticide applications	Pesticide specific	Pesticide label or other authoritative source.
	NCHEM - number of pesticides in the simulation	Set as appropriate.	Assessment specific.
	FRMFLG - Flag for testing ideal moisture conditions for pesticide applications	Set to "0"	Generally not used.
	DKFLG2 - Flag to allow biphasic half-life	Set as appropriate and use record 14	Pesticide specific.

PRZM Record Number	PRZM Description	Input Value	Source
14	DKDAY/DKMNTH/DKNU M - Day, month and number of day after first half-life begins that half-life two begins	Set as appropriate	Pesticide specific.
15	PSTNAM - Pesticide name for output file	Pesticide specific	Record generally contains the pesticide name and basic fate parameters such as the aerobic soil half-life and K_D or Koc. This is a free form record allowing information as desired.
16	APD/APM/IAPYR - Day, month and year of pesticide application	Pesticide specific	Label or other authoritative source such as the local Extension Agent. Provide details in the scenario Metadata File.
	WNDAY - Number of days soil moisture	Used on if FRMFLG is used. Set to "0"	Generally not used.
	CAM - Application method	Pesticide specific	Pesticide Label. CAM 3 is not used.
	DEPI - Depth of pesticide application	Pesticide/crop specific	Pesticide Label or crop specific pest management procedures. Used only for CAM 4,5,6,7,8. See PRZM 3.0 Manual (Carsel, <i>et al.</i>) for more details.
	TAPP - Application rate (kg/ha)	Pesticide/crop specific	Pesticide Label or other authoritative source.
	APPEFF - Application efficiency to target	Specific to application method	For the pond scenario see: Input Parameter Guidance, (USEPA, 2001) and for the reservoir: Jones, <i>et al.</i> , 2000.
	DRFT - Spray drift fraction to pond or reservoir	Specific to application method	For the pond scenario see: Input Parameter Guidance, (USEPA, 2001) and for the reservoir: Jones, <i>et al.</i> , 2000.
17	FILTRA - Filtration parameter	Only if CAM = 3. Set to "0.0"	This method is generally not used

PRZM Record Number	PRZM Description	Input Value	Source
	IPSCND - Condition for deposition of foliar pesticide after harvest	Required for CAM 2,3.	Because CAM 2 is sometimes used, set value to "1". Remaining pesticide will be converted to soil applied. This will provide a conservative assessment.
	UPTKF - Plant uptake factor	Set to "0"	Data generally not available. If data are available, use cautiously.
18	PLVKRT - Pesticide Volatilization decay from plant foliage (days ⁻¹)	Pesticide/crop specific	Data from pesticide fate guideline studies and the Input Parameter Guidance, (USEPA, 2001)
	PLDKRT - Pesticide decay rate on plant foliage (days ⁻¹)	Pesticide/crop specific	Data from pesticide fate guideline studies and the Input Parameter Guidance, (USEPA, 2001)
	FEXTRC - Foliar extraction coefficient for pesticide washoff per cm of rainfall	Pesticide/crop specific. In absence of data, default is 0.5	Data from pesticide fate guideline studies and the Input Parameter Guidance, (USEPA, 2001) or use default.
18A	PTRAN12, 13, 23 - foliar transformation rate from chemical 1 to 2, 1 to 3 and 2 to 3	Pesticide specific	Data from pesticide specific guideline studies
19	STITLE - Label for soil property title	Soil specific	USDA/NRCS Official Soil Series Name, texture and hydrologic grouping are to be provided, e.g., Loring, Silt loam, HYDG: C. http://www.statlab.iastate.edu/soils/osd/
20	CORED - Flag for total depth of soil core (cm)	Set to Soil Core Depth	PIC will set this value using its database (based on STATSGO/Soils 5: http://www.ftw.nrcs.usda.gov/stat/data.html). Use this database for new scenarios, or the NRCS Soils Characterization Database: http://www.statlab.iastate.edu/soils/ss1/ . Another source of information is the County Soils Survey or the State soil scientist. A listing of available soils surveys and soil scientists are available online at http://www.statlab.iastate.edu/soils/nsdaff/ . Existing scenarios should have this value verified with one or more of these databases.

PRZM Record Number	PRZM Description	Input Value	Source
The following 9 Flags will be set and locked by the EFED Script Shell or should be set as recommended in the PRZM “.inp” file			
	BDFLAG - Flag for bulk density	Set to "0"	Bulk density is known and entered in Record 34.
	THFLAG - Field capacity	Set to "0"	Water constants are entered in Record 34.
	KDFLAG - Soil/pesticide adsorption coefficient	Set to "0"	K_D is known and set in Record 36.
	HSWTZ - Drainage flag	Set to "0"	Allows free draining rather than restricted drainage.
	MOC - Methods of characteristic	Set to "0"	Parameters not used in current surface water assessments.
	IRFLAG - Irrigation flag	Set to "0"	Parameters not used in current surface water assessments.
	ITFLAG - Soil temperature simulation flag	Set to "0"	Parameters not used in current surface water assessments.
	IDFLAG - Thermal conductivity and heat capacity flag	Set to "0"	Parameters not used in current surface water assessments.
	BIOFLAG - Biodegradation flag	Set to "0"	Parameters not used in current surface water assessments.
21-25	Used only if a Flag other than CORED is set to "1" or "2"	Not Used	Not Used.
26	DAUR - Diffusion coefficient in air	Pesticide specific	Set only if all values in Record 26 are set to a value other than "0". Data from studies on Physical Properties.
	HENRYK - Henry's Law Constant	Pesticide specific	Set only if all values in Record 26 are set to a value other than "0". Data from studies on Physical Properties.

PRZM Record Number	PRZM Description	Input Value	Source
	ENPY - Enthalpy of vaporization	Pesticide specific	Set only if all values in Record 26 are set to a value other than "0". Data from studies on Physical Properties.
27- 32	Used only if a Flag other than CORED is set to "1" or "2"	Not Used	Not Used.
33	NHORIZ - Total number of horizons	Soil specific, but minimum 3	PIG will set this value. Verify using the USDA/NRCS Official Soil Description or other source identified under Record 20. Be sure there is a minimum of 3 horizon and a reasonable number of maximum. First compartment should be thin. Set to a maximum of 10 cm. The top horizon may be divided in two, the first section having a maximum thickness of 10 cm and the second the balance of the remaining thickness. Both horizons will have identical properties. The purpose of this is to allow small compartments within the horizon without exceeding the programs maximum permissible. See Record 37 for the compartment parameter. http://www.statlab.iastate.edu/soils/osd/
34	HORIZN - Horizon number	Soil specific	Begin with number "1"
	THKNS - Horizon thickness (cm)	Horizon "1"	Soil Series specific. PIG will set this value using its database (based on STATSGO/Soils 5: http://www.ftw.nrcs.usda.gov/stat_data.html). Use this database for new scenarios or the NRCS Soils Characterization Database: http://www.statlab.iastate.edu/soils/ss1/ . Existing scenarios should have this value verified with one or more of these databases or those identified in Record 20.
	BD - Bulk density		Soil Series specific. PIG will set this value using its database (based on STATSGO/Soils 5: http://www.ftw.nrcs.usda.gov/stat_data.html). Use this database for new scenarios or the NRCS Soils Characterization Database: http://www.statlab.iastate.edu/soils/ss1/ . Existing scenarios should have this value verified with one or more of these databases or those identified in Record 20..

PRZM Record Number	PRZM Description	Input Value	Source
	THETO - Initial soil water content ($\text{cm}^3 \text{ cm}^{-3}$)		Soil series specific. PIC will set this value using its database (based on STATSGO/Soils 5: http://www.ftw.nrcs.usda.gov/stat_data.html). Use this database for new scenarios, or the NRCS Soils Characterization Database: http://www.statlab.iastate.edu/soils/ssl/ . Existing scenarios should have this value verified with one or more of these databases or those identified in Record 20..
	AD - Soil drainage parameter	Set to "0"	HSWZT set to "0"
	DISP - Pesticide hydrodynamic solute dispersion coefficient	Set to "0"	Not used in surface water modeling.
	ADL - Lateral soil drainage parameter	Set to "0"	HSWZT set to "0" and not used in surface water modeling.
35	Not used - BIOFLAG set to "0"		
36	DWRATE/DSRATE/DGRA TE - Dissolved, adsorbed, and vapor phase pesticide decay rates. (Day^{-1})	Pesticide specific	Laboratory Studies. Aerobic Soil Metabolism Studies. See Input Parameter Guidance.
37	DPN - Thickness of compartments with the horizon (cm)	Horizon "1" set to 0.1. Lower horizons can be 1 - 10	QA/QC Workgroup consensus: The horizon thickness will be divided into compartments of specified thickness. Fractional compartments are not permitted. The first compartment is to be divided into 0.1 cm segments. Remaining compartments should be either 1.0, 2.0 or 5.0 cm.
	THEFC - Field capacity in the horizon ($\text{cm}^3 \text{ cm}^{-3}$)	Soil specific	PIC will set this value using its database (based on STATSGO/Soils 5: http://www.ftw.nrcs.usda.gov/stat_data.html). Use this database for new scenarios, or the NRCS Soils Characterization Database: http://www.statlab.iastate.edu/soils/ssl/ . Existing scenarios should have this value verified with one or more of these databases or those identified in Record 20..

PRZM Record Number	PRZM Description	Input Value	Source
	THEWP - Wilting point (cm ³ cm ⁻³)	Soil specific	PIC will set this value using its database (based on STATSGO/Soils 5: http://www.ftw.nrcs.usda.gov/stat/data.html). Use this database for new scenarios, or the NRCS Soils Characterization Database: http://www.statlab.iastate.edu/soils/ssl/ . Existing scenarios should have this value verified with one or more of these databases or those identified in Record 20..
	OC - Organic carbon (%)	Soil specific	PIC will set this value using its database (based on STATSGO/Soils 5: http://www.ftw.nrcs.usda.gov/stat/data.html). Use this database for new scenarios, or the NRCS Soils Characterization Database: http://www.statlab.iastate.edu/soils/ssl/ . Existing scenarios should have this value verified with one or more of these databases or those identified in Record 20..
	KD - Partition coefficient (cm ³ g ⁻¹)	Pesticide specific	Laboratory Studies. Batch Equilibrium studies. See Input Parameter Guidance (USEPA, 2001).
Repeat Records 33, 34, 36, 37 for each horizon in the soil profile			
38 - 39	Not used	Not used	
40	ILP - Flag for initial pesticide level	Set to "0"	Do not assume prior pesticide applications.
	CFLAG - Conversion flag for initial pesticide levels	Set to "0"	Do not assume prior pesticide applications.
41	Not used.	Not used - related to Record 40	

PRZM Record Number	PRZM Description	Input Value	Source																																																
42 - 46	These Records are set to defaults which control the time steps and outputs. All newly created scenarios will have these parameters set by the EPA Shell (Kennedy, I., 2001). The structure follows:	<table> <thead> <tr> <th></th> <th>YEAR</th> <th>10</th> <th>YEAR</th> <th>10</th> <th>YEAR</th> <th>10</th> <th>1</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1</td> <td>----</td> <td>7</td> <td>YEAR</td> <td>TSER</td> <td>0</td> <td>0</td> </tr> <tr> <td>PRCP</td> <td>TSER</td> <td>0</td> <td>0</td> <td>RUNF</td> <td>TSER</td> <td>0</td> <td>0</td> </tr> <tr> <td>INFL</td> <td>TSER</td> <td>1</td> <td>1</td> <td>ESLS</td> <td>TSER</td> <td>0</td> <td>0</td> </tr> <tr> <td>RFLX</td> <td>TSER</td> <td>0</td> <td>0</td> <td>EFLX</td> <td>TSER</td> <td>0</td> <td>1.0E5</td> </tr> <tr> <td>RZFX</td> <td>TSER</td> <td>0</td> <td>0</td> <td></td> <td></td> <td>1.0E5</td> <td></td> </tr> </tbody> </table>		YEAR	10	YEAR	10	YEAR	10	1	1	1	----	7	YEAR	TSER	0	0	PRCP	TSER	0	0	RUNF	TSER	0	0	INFL	TSER	1	1	ESLS	TSER	0	0	RFLX	TSER	0	0	EFLX	TSER	0	1.0E5	RZFX	TSER	0	0			1.0E5		
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